WHAT IS CLAIMED IS:

1. A method of ultrasonically displaying an invasive medical device (30) and the volumetric region (122) of a body in which it is located comprising:

scanning the volumetric region (122) with beams transmitted by an ultrasonic array transducer (10);

receiving echo signals from the volumetric region (122) and from an invasive medical device (30) located in the region;

processing echo signals to produce a wide field of view (120) of the volumetric region (122);

processing echo signals to produce a detailed view of the portion of the volumetric region (122) in which the invasive medical device (30) is located; and

displaying both the wide field of view (120) of the volumetric region (122) and the detailed view of the portion of the volumetric region (122) in which the invasive medical device (30) is located on an image display (18).

2. The method of Claim 1, wherein processing the echo signals to produce a wide field of view (120) comprises processing the echo signals to produce a wide field of view two dimensional image; and

wherein processing the echo signals to produce a detailed view comprises producing a volume rendering of a portion of the volumetric region (122).

3. The method of Claim 2, wherein displaying further comprises displaying the wide field of view two dimensional image and the volume rendering in different areas of an image display (18).

4. The method of Claim 3, further comprising designating the spatial location of the volume rendering in the two dimensional image.

5. The method of Claim 2, wherein displaying further comprises displaying the wide field of view two dimensional image and the volume rendering in spatial alignment in a common area of an image display (18).

6. The method of Claim 1, wherein processing the echo signals to produce a wide field of view (120) comprises volume rendering the echo signals to produce a wide field of view three dimensional image; and

wherein processing the echo signals to produce a detailed view comprises producing a volume rendering of a portion of the volumetric region (122).

7. The method of Claim 6, wherein displaying further comprises displaying the wide field of view three dimensional image and the volume rendering of the portion of the volumetric region (122) in different areas of an image display (18).

8. The method of Claim 7, further comprising designating the spatial location of the volume rendering of the portion of the volumetric region (122) in the wide field of view three dimensional image.

9. The method of Claim 6, wherein displaying further comprises displaying the wide field of view three dimensional image and the volume rendering of the portion of the volumetric region (122) in spatial alignment in a common area of an image display (18).

10. The method of Claim 9, wherein displaying further comprises displaying the volume rendering of the portion of the volumetric region (122) in a separate enlarged or zoomed view.

11. The method of Claim 1, wherein displaying further comprises displaying the detailed view of the portion of the volumetric region (122) in an enlarged or zoomed view.

12. The method of Claim 1, further comprising processing echo signals to produce a time-based display; and

wherein displaying further comprises displaying the time-based display on an image display (18).

13. The method of Claim 12, wherein processing echo signals to produce a time-based display further comprises processing echo signals to produce a spectral Doppler display, an M-mode display, or a color M-mode display.

14. The method of Claim 1, wherein scanning further comprises transmitting a relatively low beam density over a volumetric region (122), with a relatively high beam density being transmitted in a portion of the volumetric region (122) in which an invasive medical device (30) is located.

15. The method of Claim 14, wherein processing echo signals to produce a wide field of view (120) further comprises processing echo signals received from a low beam density region of the volumetric region (122); and

wherein processing echo signals to produce a detailed view further comprises processing echo signals received from a high beam density region of the volumetric region (122).

16. An ultrasonic surgical guidance imaging system which acts to guide the placement or observe the operation of an invasive medical device (30) comprising:

an ultrasonic probe (10) including an array transducer which steers ultrasonic beams over a volumetric surgical region (120) which includes an invasive medical device (30);

a transmit beamformer coupled to the array transducer which acts to control the spatial beam density of the beams transmitted by the array transducer in the volumetric region (120);

a receive beamformer coupled to the array transducer and responsive to echo signals from array elements for the production of received scanlines in the vicinity of the invasive medical device (30) and in the volumetric region (120) at locations removed from the invasive medical device location;

an image processor (68) responsive to the received scanlines for producing a wide field of view of the volumetric surgical region (120) and a detailed view of the invasive medical device (30); and

a display (18) coupled to the image processor (68) which displays both the wide field of view of the volumetric surgical region (120) and the detailed view of the invasive medical device (30).

17. The ultrasonic surgical guidance imaging system of Claim 16, wherein the display is operated to display both the wide field of view of the volumetric surgical region (120) and the detailed view of the invasive medical device (30) in spatial registration.

18. The ultrasonic surgical guidance imaging system of Claim 16, wherein the transmit beamformer acts to control the spatial beam density of the beams transmitted by the array transducer to be different in the vicinity of the invasive medical device (30) than in the volumetric region (120) at locations removed from the invasive medical device location.

19. The ultrasonic surgical guidance imaging system of Claim 16, wherein the receive beamformer comprises a multiline receive beamformer.

20. The ultrasonic surgical guidance imaging system of Claim 19, wherein the multiline receive beamformer is operated for the production of a different number of received multilines for each transmit beam in the vicinity of the invasive medical device (30) than that produced in the volumetric region (120) at locations removed from the invasive medical device location.